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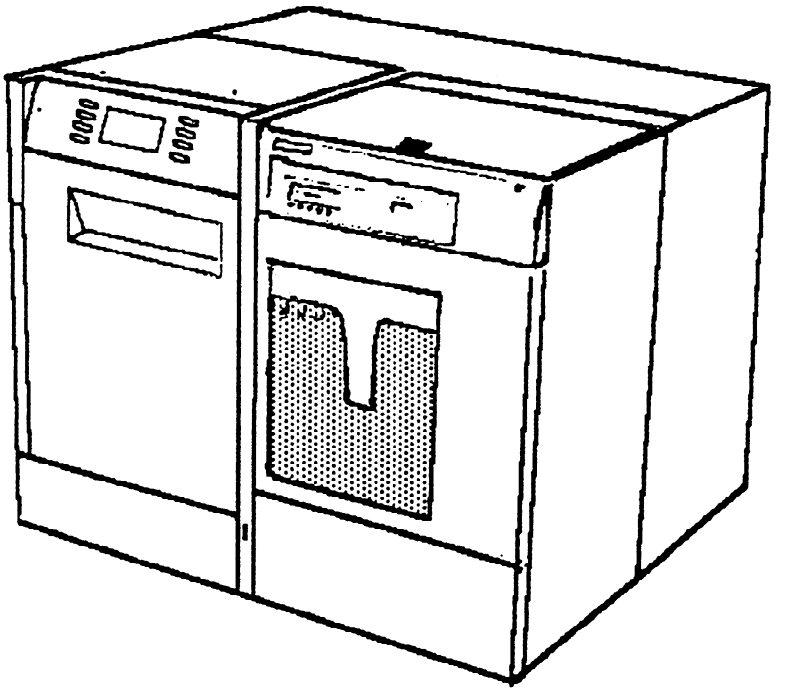
THEORY GUIDE

for the

Kodak Multiloader 700 Side-By-Side Kit



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1. INTRODUCTION

The Kodak Multiloader 700 Side-By-Side Kit, hereafter called SBS, consists out of:
one ML700 (50/60Hz) without TUNNEL
one SBS with a PROCESSOR INTERFACE, depending on type of PROCESSOR
one optional DARK ROOM FEED TRAY, hereafter called DFT
one PROCESSOR (460/480RA, M6B, M6AW)
one PROCESSOR READY KIT if a PROCESSOR M6B is used
one PROCESSOR READY KIT and one PROCESSOR START KIT if a PROCESSOR M6AW is used
The PROCESSOR can be placed on either side of the ML700.

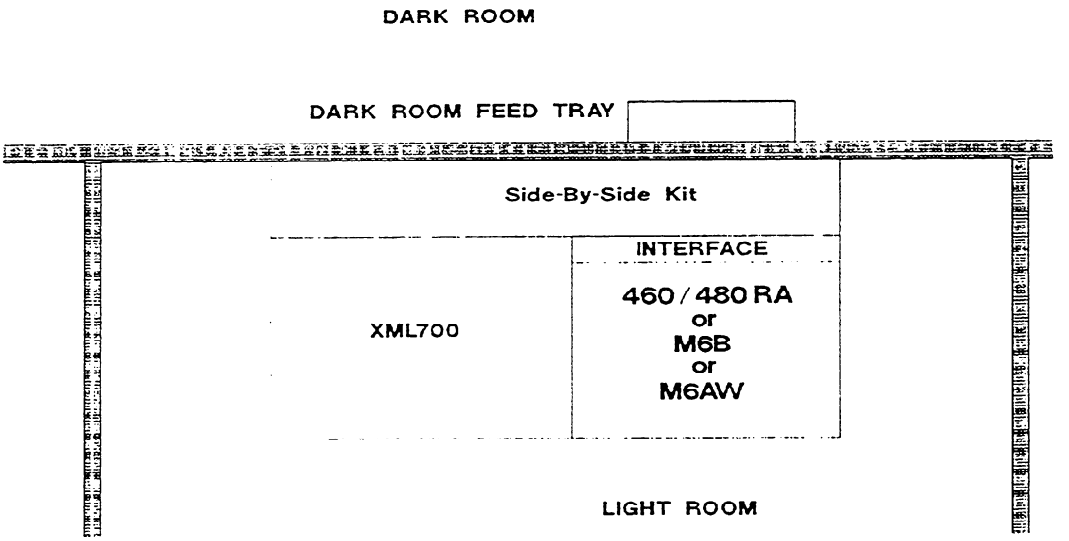


figure 1-1

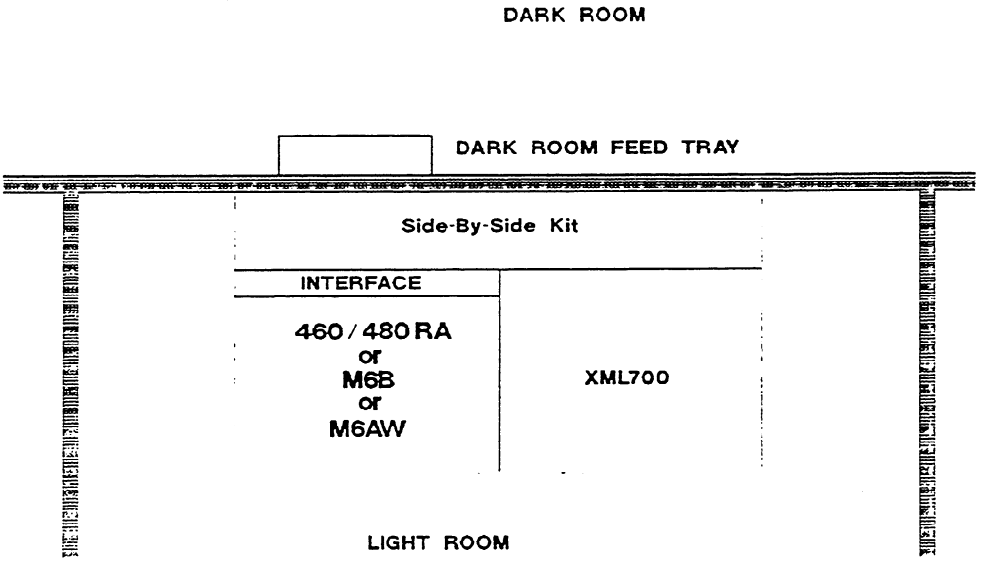


figure 1-2

The SBS is set up in the factory already to the customer needs. However it is possible to change the SBS orientation in the field. The Multiloader 700 needs software version 4.0 or higher. This is due to the fact, that the standard ML700 operating software (version 3.2 or lower) cannot handle the SBS.

2. ELECTRONIC SYSTEM

POWER SUPPLY

The POWER SUPPLY receives its power via a WALL OUTLET. The SBS FAN must be running 24 hours a day to keep chemical fumes from the PROCESSOR out of the SBS.

There are 2 TRANSFORMERS with 2 secondary coils each. Each secondary output is connected via a fuse to a separate FULL-WAVE BRIDGE RECTIFIER. A simple capacitor FILTER is added to each output of the BRIDGE RECTIFIER.

The POWER SUPPLY has 4 unregulated outputs:

1. VμP Unregulated MICROPROCESSOR VOLTAGE +10V, derived from VAC11-12 GND μP

2. VPE 40 Unregulated PERIPHERAL VOLTAGE +30V, derived from VAC 21-22 GNDPE 40

3. VPE 50 Unregulated PERIPHERAL VOLTAGE +30V, derived from VAC 31-32 GNDPE 50

4. VPE 10 Unregulated PERIPHERAL VOLTAGE +10V, derived from VAC 41-42 GNDPE 10

The voltage regulation is done on PCB A3(Slave Processor) and on PCB A4 (SBS Interface).

The purpose of VAC 41-42 is twofold:

1. It is used to generate VPE 10.

2. It goes via the OPTOCOUPLER LB1 to PCB A4 and then to the SLAVE PROCESSOR PCB A3. There the signal is used to detect if the system is powered with 50 Hz or with 60 Hz. This is important to know, because with 60 Hz the FILM is transported faster out of the ML700 and the speed of MOTOR M2 in the SBS has to be set to the correct value.

MOTORS

The SBS has 3 MOTORS:

1. MOTOR M1/CA. This is the CARRIAGE MOTOR. It moves the CARRIAGE from left to right (from the PROCESSOR to the ML700 and back). This MOTOR is a DC MOTOR.

2. MOTOR M2/FT. This MOTOR drives the CARRIAGE BELTS. Thus transporting the FILM from the ML700 into the CARRIAGE and then from the CARRIAGE into the PROCESSOR INTERFACE. This MOTOR is a STEPPER MOTOR.

3. MOTOR M3/FT. This MOTOR drives the FILM through the PROCESSOR INTERFACE into the PROCESSOR. This MOTOR is a STEPPER MOTOR.

INTERLOCK SYSTEM

There are 2 REED CONTACTS on either side of the SBS. They are connected in series. Two small permanent magnets are fixed to the SBS COVER. If this COVER is in place, both REED CONTACTS are closed and RELAY K1 on PCB A4 is energised. Contact K1(3-4) is made and VPE 51 is connected to the BRIDGE DRIVER U20 for MOTOR M1. As soon as the COVER is not in place, RELAY K1 is de energised and VPE51 is removed from U20. This means MOTOR M1 is switched off.

PRINTED CIRCUIT BOARDS

There are 3 PCB's:

1. PCB A2 RELAY BOARD

2. PCB A3 SLAVE PROCESSOR

3. PCB A4 SBS INTERFACE

PCB A2 is a small RELAY BOARD. It receives power from the WALL OUTLET and from the PROCESSOR SAFE LIGHT RECEPTACLE. If the PROCESSOR is switched off, RELAY K1 on PCB A2 is de energised. In this case only the SBS FAN is connected to the mains. If the PROCESSOR is switched on, the 120 VAC from the SAFE LIGHT RECEPTACLE energise RELAY K1. In this case the SBS FAN and the SBS POWER SUPPLY are connected to the mains. The SBS is now ready to operate.

PCB A3 is the very same BOARD as PCB A3 of the ML300. Just the program in the EPROM is different. All the SBS FUNCTIONS are controlled by PCB A3.

PCB A4 is more or less an I/O DRIVER BOARD. The signal of a SENSOR goes to the input of an OPERATIONAL AMPLIFIER. This OP-AMP works as a COMPARATOR. This means the input looks somehow analog (depending on how fast the photo sensor is covered by the FILM) and the output is a signal with correct logical levels for High and Low. The output signal goes then to an OPTO COUPLER. This OPTO COUPLER is used as an isolator to keep electrical noise on the PERIPHERAL VOLTAGES of the SLAVE PROCESSOR.

The output signals from the SLAVE PROCESSOR goes most times to a BUFFER on PCB A4 and from there to an OPTO COUPLER. If necessary the output of the OPTO COUPLER becomes amplified to drive the selected device (for example the BUZZER or an INDICATOR LED). The BUFFERS are needed, because the fan-out of the SLAVE PROCESSOR outputs is not big enough to drive the OPTO COUPLERS.

3. FUNCTIONAL DESCRIPTION

1. As long as the PROCESSOR is not READY, the message PROCESSOR NOT READY will be displayed at the OPERATOR CONTROL PANEL.

2. A CASSETTE is fed into the ML700. The metal edge of the CASSETTE is sensed by the 2 INDUCTIVE SENSORS. This causes the PROCESSOR START SIGNAL to go Low.

3. The PROCESSOR START SIGNAL is received by the SBS. CARRIAGE MOTOR M1 is turned on. The CARRIAGE moves from the PROCESSOR side (HOME POSITION) to the MULTILOADER side.

4. The CARRIAGE reaches the ML700 position. This is detected by SENSOR B3 or B4(depending on which side of the ML700 the PROCESSOR is installed). Motor M2 (CARRIAGE BELTS) is turned on. The signal TSR (TUNNEL SENSOR REAR) on PCB A4 goes Low. This signal tells the ML700 that the SBS is ready to accept a FILM.

5. The FILM is picked up from the CASSETTE and is transported through the CONVEYER into the SBS.

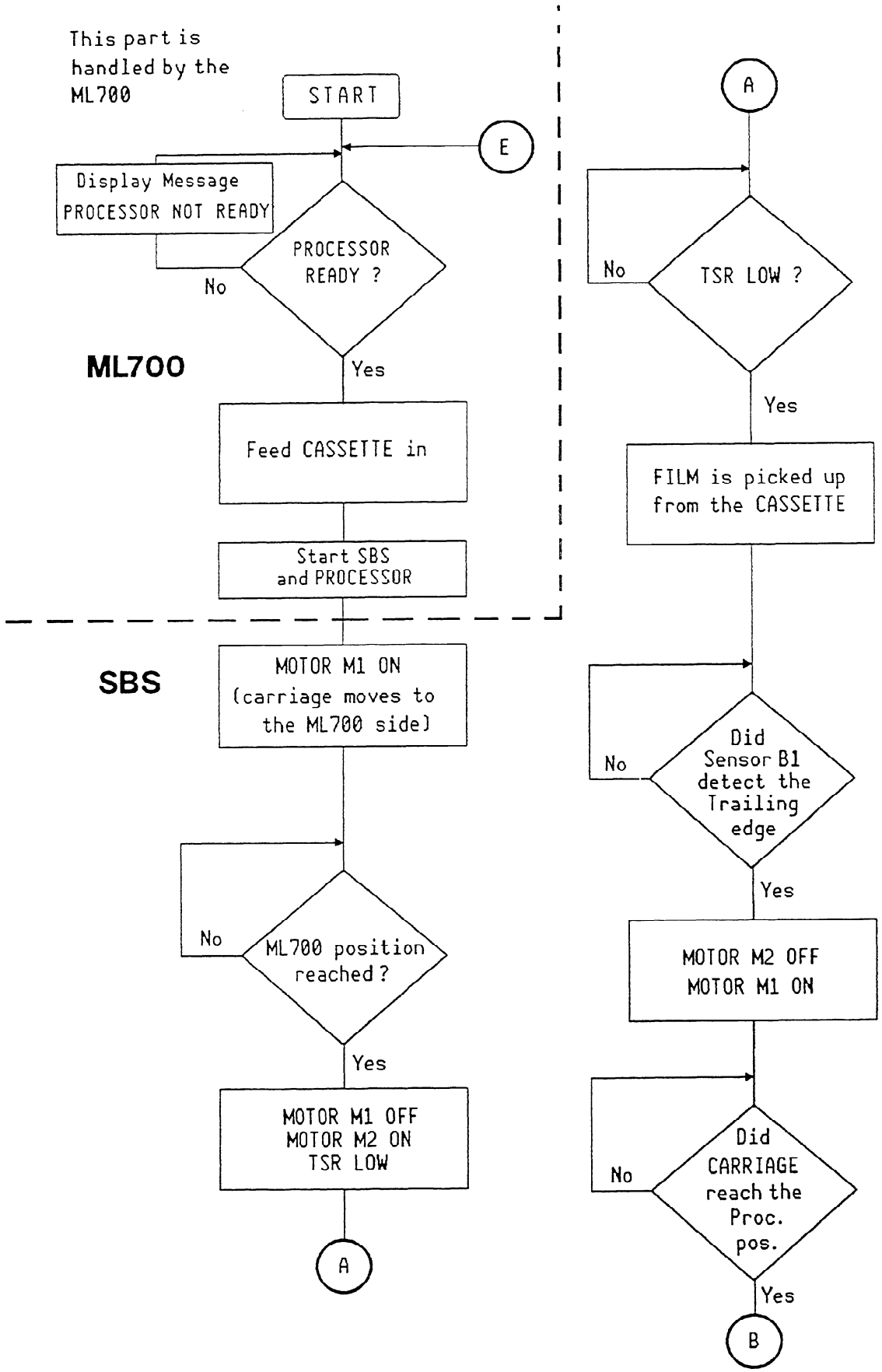
6. SENSOR B1/MFI is at the SBS ENTRANCE. Its purpose is to detect the trailing edge of the FILM. As soon as the trailing edge is detected, the CARRIAGE BELT MOTOR M2 is turned off.

7. CARRIAGE MOTOR M1 is turned on and the CARRIAGE is transported to the PROCESSOR side.

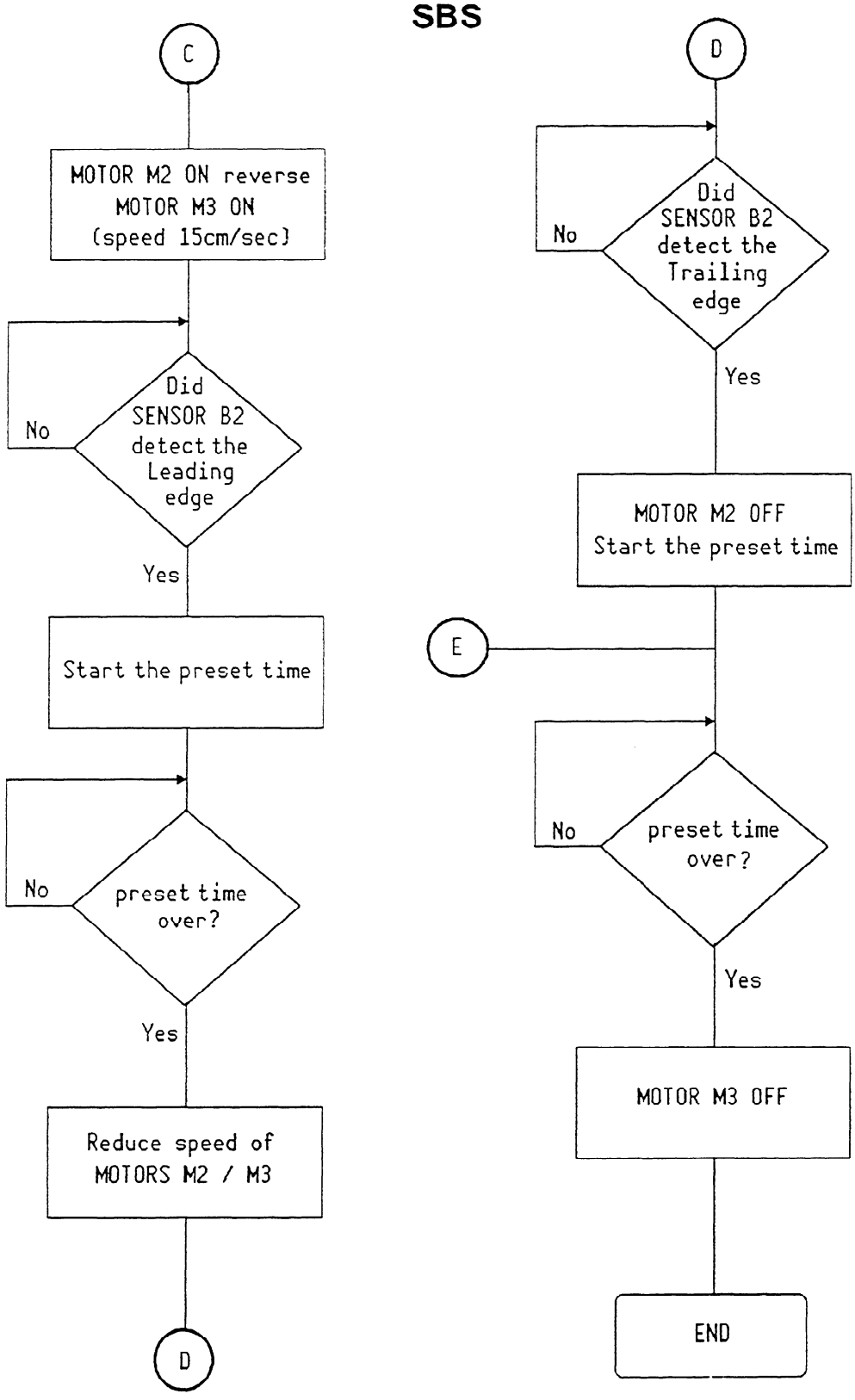
8. The CARRIAGE reaches the PROCESSOR side. This is detected by SENSOR B3 or B4 (depending on which side of the ML700 the PROCESSOR is installed). The CARRIAGE BELT MOTOR M2 is turned on in the opposite direction to transport the FILM out of the CARRIAGE into the PROCESSOR INTERFACE. The MOTOR drives the FILM at this time with a speed of 15cm/se. As soon as MOTOR M2 is turned on, the PROCESSOR INTERFACE MOTOR M3 is turned on too.

9. The FILM is transported into the PROCESSOR INTERFACE and the ENTRANCE ROLLERS of it are separated. This operates the 2 REED CONTACTS B2 in the PROCESSOR INTERFACE. After a preset time (the time the leading edge of the FILM needs to move from B2 to the PROCESSOR) the speed of MOTOR M2 and M3 is reduced to the PROCESSOR speed. The FILM is then picked up by the PROCESSOR.

10. The trailing edge of the FILM is detected by the REED CONTACTS B2. The CARRIAGE MOTOR M2 is switched off. The SBS could now be called by the ML700 to take the next FILM. After a preset time (the time the trailing edge needs to move from B2 to the PROCESSOR) MOTOR M3 is switched off.


This part is handled by the ML700
START
E
Display Message PROCESSOR NOT READY
PROCESSOR READY ?
No
Yes
ML700
Feed CASSETTE in
Start SBS and PROCESSOR
SBS
MOTOR M1 ON (carriage moves to the ML700 side)
No
ML700 position reached ?
Yes
MOTOR M1 OFF MOTOR M2 ON TSR LOW
A
A
No
TSR LOW ?
Yes
FILM is picked up from the CASSETTE
No
Did Sensor B1 detect the Trailing edge
Yes
MOTOR M2 OFF MOTOR M1 ON
No
Did CARRIAGE reach the Proc. pos.
Yes
B

SBS


C
MOTOR M2 ON reverse
MOTOR M3 ON
(speed 15cm/sec)
Did
SENSOR B2
detect the
Leading
edge
No
Yes
Start the preset time
preset time
over?
No
Yes
Reduce speed of
MOTORS M2 / M3
D
D
Did
SENSOR B2
detect the
Trailing
edge
No
Yes
MOTOR M2 OFF
Start the preset time
E
preset time
over?
No
Yes
MOTOR M3 OFF
END

4. SOFTWARE

If the ML700 is combined with a SBS, the ML700 needs SOFTWARE VERSION 4.0 or higher.
Software Version 3.2 (or lower) is not able to communicate with the SBS.
The following software changes are made :

1. PARAMETER TUNNELFLAG

0 = NO TUNNEL

1 = CONVENTIONAL TUNNEL

2 = SBS

For installations with SBS always set this parameter to 2.

In this case RELAY PROCESSOR START K1 on PCB A4 (ML700) is energised as soon as a CASSETTE is detected by the INDUCTIVE SENSORS. It is switched off as soon as the FILM is out of the CASSETTE, or after the ML700 detected that there is no FILM in the CASSETTE. In addition K1 is energised for 100 ± 35ms when BUTTON 4 (open the MAGAZINE DOOR) is pressed. This pulse is used to block the DFT (DARK ROOM FEED TRAY). A pulse of 200 ± 35 ms is generated, if the MAGAZINE CHAMBER DOOR is closed or if SERIAL UNLOAD is aborted prior to the infeed of the CASSETTE. This long pulse enables the DFT. After a normal cycle the DFT is always enabled.

The input "TUNNEL SENSOR FRONT" (ML700) is used to generate the message "DFT IN USE". This is checked in the ML700 STANDBY MODE.

The input "TUNNEL SENSOR REAR" indicates if the SBS is able to accept the next FILM. This is checked prior to pick up of the CASSETTE FILM.

2. CONVEYER ROLLER (not applicable for the SBS)

If the TUNNEL FLAG is 0, the ROLLERS are running for 1.5 + 10 sec. after the FILM TRAILING EDGE was detected by SENSOR FOC.

3. COUNT ERROR in STATISTIC for 18x24 removed.

4. TRANSPORT BELT is running during pick up of the CASSETTE FILM.

this ensures that the CASSETTE is fully at the end stops.

5. CASSETTE SIZE DETECTION for 24 x 30 and 8 x 10 improved.

If CASSETTE LENGTH 85 or 86 is detected, SWITCH S2 (CASSETTE WIDTH 0) decides which CASSETTE is fed in.

6. The message EXPOSED FILMS USED is changed to FILMS USED.

7. SOFTWARE FILTER for PRINTER.

A software filter ensures that the printer cannot go to large characters.

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